REMARKS

Claims 25 to 29 are added, and therefore claims 13 to 29 are pending in the present application.

In view of the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

With respect to paragraph three (3) of the Office Action, claims 13 to 22 were rejected under 35 U.S.C § 102(b) as being anticipated by U.S. Patent No. 4,919,093 ("Hiraki").

To reject a claim under 35 U.S.C. § 102(b), the Office must demonstrate that each and every claim feature is identically described or contained in a single prior art reference. See *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). As explained herein, it is respectfully submitted that the Office Action does not meet this standard, for example, as to all of the features of the claims. Still further, not only must each of the claim features be identically described, an anticipatory reference must also enable a person having ordinary skill in the art to practice the claimed invention, namely the claimed subject matter of the claims, as discussed herein. See *Akzo, N.V. v. U.S.I.T.C.*, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986).

As further regards the anticipation rejections, to the extent that the Final Office Action may be relying on the inherency doctrine, it is respectfully submitted that to rely on inherency, the Examiner must provide a " basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied art." See M.P.E.P. § 2112 (citing *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int'f. 1990) (emphasis in original)). Thus, the M.P.E.P. and the case law make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic.

Claim 13 is to a fuel-injection system for direct injection of fuel into a combustion chamber through a combustion-chamber top located opposite from a piston. The fuel-injection system comprises a fuel injector having a plurality of spray-discharge orifices discharging a corresponding plurality of fuel jets, wherein the plurality of fuel jets form a spray cloud in the combustion chamber. Further, a first opening angle of the spray cloud along a first cross-sectional plane bisecting the longitudinal axis of the fuel injector is greater than a second opening angle of the spray cloud along a second cross-sectional plane bisecting the longitudinal axis of the fuel injector, the second cross-sectional plane extending perpendicular to the first cross-sectional plane. The Hiraki reference does not identically

disclose (or suggest) two such opening angles of spray, one greater than the other, as provided for in the context of the presently claimed subject matter.

Figures 7 and 9 of Hiraki, and their related text, for example, at column 6, lines 34 to 40, refer to "a plurality of injection holes 14 arranged on the periphery of the fore end part of the injection nozzle 11 in two rows concentrically relative to the center axis L of the injection nozzle." Being concentric to the center axis L of the injection nozzle, this arrangement of injection holes is also symmetrical about the center axis L. There is no disclosure of any two opening angles of spray being different, one greater than the other, and there is further no disclosure of any two opening angles of spray being different in two cross-sectional planes that are perpendicular to one another. Any asymmetry in the opening angles of spray in Hiraki exists only between the two concentric rows of injection holes 14, and not between perpendicular cross-sectional planes.

The Hiraki reference does not identically disclose (or even suggest) a first opening angle of the spray cloud along a first cross-sectional plane bisecting the longitudinal axis of the fuel injector that is greater than a second opening angle of the spray cloud along a second cross-sectional plane bisecting the longitudinal axis of the fuel injector, the second cross-sectional plane extending perpendicular to the first cross-sectional plane.

Accordingly, for at least these reasons, Hiraki does not anticipate claim 13, or its dependent claims 14 to 22.

As further regards claim 14, Hiraki does not identically disclose (or even suggest) a clearance angle that is uniform along the circumference of the spray cloud. Nowhere does Hiraki even disclose the shape of the combustion-chamber top, alone or in relation to the angle of the spray cloud. As no clearance angle is disclosed in Hiraki, neither is any uniformity in the clearance angle disclosed.

Accordingly, for at least these additional reasons, Hiraki does not anticipate claim 14, or its dependent claims 15 to 22.

As further regards claim 15, as explained above with respect to claim 14, Hiraki does not disclose the shape of the combustion-chamber top. The Hiraki reference therefore also does not disclose that the combustion-chamber top conically widens from the fuel injector along the second cross-sectional plane bisecting the longitudinal axis of the fuel injector, or that the combustion-chamber top widens from the fuel injector along the first cross-sectional plane bisecting the longitudinal axis of the fuel injector at a greater gradient than along the second cross-sectional plane.

Accordingly, for at least these additional reasons, Hiraki does not anticipate claim 15, or its dependent claims 15 to 22.

As further regards claim 20, Hiraki does not identically disclose (or even suggest) the depth of fuel jets, since it merely refers to the fuel jets in terms of the angles assumed by the injection holes 14. Accordingly, for at least these additional reasons, Hiraki does not anticipate claim 20, or its dependent claim 21.

Withdrawal of this anticipation rejections is therefore respectfully requested.

With respect to paragraph four (4) of the Office Action, claims 13 to 22 were rejected under 35 U.S.C § 102(b) as being anticipated by U.S. Patent No. 4,548,172 ("Bailey"). Bailey does not disclose a first opening angle of the spray cloud along a first cross-sectional plane bisecting the longitudinal axis of the fuel injector that is greater than a second opening angle of the spray cloud along a second cross-sectional plane bisecting the longitudinal axis of the fuel injector, the second cross-sectional plane extending perpendicular to the first cross-sectional plane.

Figures 1 to 3 of Bailey, and their related text, refer to a nozzle tip 58 which includes primary fuel spray orifices 62 which spray primary fuel streams 66, and secondary fuel spray orifice 98 which sprays secondary fuel stream 110 at a deflecting face 106. As disclosed, for example, at column 3, lines 63 to 68, primary fuel streams 66 are sprayed "radially outwardly." Similarly to Hiraki, this arrangement of fuel spray orifices is symmetrical about the fuel injection nozzle axis. There is no disclosure of any two opening angles of spray being different, one greater than the other, and there is further no disclosure of any two opening angles of spray being different in two cross-sectional planes that are perpendicular to one another. Any asymmetry in the opening angles of spray in Bailey exists only between the primary and secondary fuel spray orifices, and not between perpendicular cross-sectional planes.

The Bailey reference does not identically disclose (or even suggest) a first opening angle of the spray cloud along a first cross-sectional plane bisecting the longitudinal axis of the fuel injector that is greater than a second opening angle of the spray cloud along a second cross-sectional plane bisecting the longitudinal axis of the fuel injector, the second cross-sectional plane extending perpendicular to the first cross-sectional plane.

Accordingly, for at least these reasons, Bailey does not anticipate claim 13, or its dependent claims 14 to 22.

As further regards claim 14, Bailey does not identically disclose (or even suggest) a clearance angle that is uniform along the circumference of the spray cloud. Nowhere does Bailey even disclose the clearance angle between the fuel streams and any combustion-chamber top, or any uniformity therein.

Accordingly, for at least these additional reasons, Bailey does not anticipate claim 14, or its dependent claims 15 to 22.

As further regards claim 15, Bailey does not identically disclose the shape of the combustion-chamber top. Figures 1 and 3 concern, at most, a flat combustion-chamber top, so that Bailey does not disclose that the combustion-chamber top conically widens from the fuel injector along the second cross-sectional plane bisecting the longitudinal axis of the fuel injector, or that the combustion-chamber top widens from the fuel injector along the first cross-sectional plane bisecting the longitudinal axis of the fuel injector at a greater gradient than along the second cross-sectional plane.

Accordingly, for at least these additional reasons, Bailey does not anticipate claim 15, or its dependent claims 15 to 22.

As further regards claim 20, Bailey does not disclose, or even suggest, the depth of fuel jets. Bailey merely discloses that the secondary fuel stream 110 emitted from secondary spray orifice 98 is deflected from deflection face 106. Accordingly, for at least these additional reasons, Bailey does not anticipate claim 20, or its dependent claim 21.

As further regards claim 21, Bailey does not disclose (or even suggest) that the primary and secondary fuel spray orifices are any different in size from one another, nor does Bailey disclose (or even suggest) that a different fuel pressure is applied to the primary or secondary fuel spray orifices. Accordingly, for at least these additional reasons, Bailey does not anticipate claim 21.

Withdrawal of this anticipation rejection is therefore respectfully requested.

With respect to paragraph six (6) of the Office Action, claims 23 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hiraki or Bailey.

To reject a claim under 35 U.S.C. § 103(a), the Office bears the initial burden of presenting a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish *prima facie* obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Also, as clearly indicated by the Supreme Court in *KSR*, it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *See KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). In this regard, the Supreme Court further noted that "rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.*, at 1396. Second, there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim features. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

Claims 23 and 24 depend from claims 13 to 16, and therefore incorporate all of the features of those claims. As explained above as to claims 13 to 16, neither Hiraki or Bailey disclose, or even suggest, all of the features of claims 13 to 16. As the Office Action does not cite any teaching that would cure the critical deficiencies of Hiraki and Bailey, claims 23 and 24 are allowable for at least the reasons explained above as to claims 13 to 16.

Withdrawal of the obviousness rejections is therefore respectfully requested.

In sum, it is respectfully submitted that claims 13 to 24 are allowable.

New claims 25 to 29 do not add new subject matter and are supported by the present application, including the specification. Claims 25 to 29 depend from claim 13, and they are therefore allowable for the same reasons.

In sum, it is respectfully submitted that claims 13 to 29 are allowable.

CONCLUSION

It is therefore respectfully submitted that all of the presently pending claims are allowable. It is therefore respectfully requested that the rejections (and any objections) be withdrawn, since all issues raised have been addressed and obviated. An early and favorable action on the merits is therefore respectfully requested.

Respectfully submitted,

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By: _____

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